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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/026,519	12/27/2001	Isao Suzuki	2001_1877	1889

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EXAMINER	
KRISHNAMURTHY, RAMESH	
ART UNIT	PAPER NUMBER
3753	

DATE MAILED: 11/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/026,519	SUZUKI, ISAO	
	Examiner	Art Unit	
	Ramesh Krishnamurthy	3753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 August 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 - 14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,9 and 14* is/are rejected.

7)☒ Claim(s) *6 - 8 and 10 - 13* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

This office action is responsive to communications filed 08/28/2003.

Claims 1 – 14 are pending.

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1 – 3 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bump et al. (5,911,238) in view of Sangl (US 3,762,683).

Bump et al. discloses a mass flow controller (Fig. 5) for controlling a mass flow rate, in which mass flow rate of a fluid is detected by a flow rate sensor (114) of the flowmeter (100) and a control valve (124, 126) is operated so as to adjust the detected mass flow rate to a desired value,

Wherein said control valve is arranged as a solenoid valve operated by means of a solenoid and a plunger for opening and closing said solenoid valve is disposed within a cylindrical conduit.

The patent to Bump et al. discloses the claimed invention with the exception of disclosing the cylindrical conduit to have a hollow structure, whereby one-way flow of the fluid is effected in a space between an outer circumferential surface of the plunger and inner circumferential surface of the conduit in a direction of the axis of the conduit.

The patent to Sangl discloses (Figs. 1, 2) a solenoid actuated valve wherein a one-way flow of the fluid is effected in a space (12) between an outer circumferential surface of the plunger (2) and inner circumferential surface of the conduit in a direction

of the axis of the conduit (1b). The arrangement disclosed by Sangl provides for a low pressure drop between the inlet (10) and the outlet (11) of the valve. In contrast, the control valve in Bump et al., the fluid has to turn through 90 degrees as it flows across the control valve thereby resulting in a higher pressure drop and attendant regions of re-circulating flow that could potentially affect accurate flow control.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have replaced the solenoid-driven control valve in Bump et al. with the solenoid-driven valve disclosed by Sangl for the purpose of achieving lower pressure drop and also thereby avoiding regions of re-circulating flow that could potentially affect accurate flow control.

Regarding Claim 2, it is noted that Sangl discloses (see fig. 2) grooves formed on the inside circumferential wall of the conduit (1b). To have provided the grooves on the outer surface of the plunger (2) rather on the inside surface of the conduit (1b) is a mere reversal of parts and the courts have generally held that reversal of parts is an expedient that is obvious to one of ordinary skill in the art. *In re Gazda*, 219 F.2d 449, 104 USPQ 400 (CCPA 1955).

Regarding claim 3, it is noted that Sangl discloses the plunger (2) to be made of corrosion-resistant material (Col. 2, lines 1, 2).

Regarding claim 9, it is noted that the thermal mass flow sensor (14) in Bump et al. is connected in parallel with the conduit.

Regarding claim 14, it is noted that claim 14 is essentially a combination of claims 1 and 2. Furthermore, "the valve head being attached to the plunger" as recited

in line 9 of claim 14, is inherent to the plunger (2) of Sangl, the valve head (7) co-operating with a corresponding valve seat (8).

3. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bump et al. (5,911,238) in view of Sangl (US 3,762,683) as applied to claims 1 – 3, 9 and 14 above and further in view of Kervagoret (US 4,790,351).

The device according to the combination of Bump et al. and Sangl discloses the claimed invention with the exception of disclosing a spherical valve head attached to the plunger and a corresponding valve seat being arranged in a funnel-like form.

The patent to Kervagoret discloses (Fig. 1) a solenoid actuated valve having a plunger (31) to which is attached a spherical valve head (32) and a corresponding valve seat (39) being arranged in a funnel-like form, for the purpose of providing a better sealing and easy replaceability.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided in the combination of Bump et al. and Sangl, a spherical valve head attached to the plunger and a corresponding valve seat being arranged in a funnel-like form, for the purpose of providing a better sealing and easy replaceability, as recognized by Kervagoret.

4. Claims 6 –8 and 10 - 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

5. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record neither shows nor teaches a combination for the claimed

mass flow controller that comprises in combination with the other elements recited, (a) a cylindrical yoke disposed adjacent the plunger with the yoke being adjustable with respect to the direction of the axis of the conduit, whereby an initial gap between the plunger and the yoke can be adjusted or (b) a spring being provided between the plunger and the valve seat to obtain a normally open valve structure or (c) a doughnut-like permanent magnet is positioned at an outer circumferential surface of said conduit at a position corresponding to said plunger, with the position of the magnet being adjustable with respect to the direction of the axis of the conduit, whereby an initial gap between the plunger and the valve seat can be adjusted or (d) the mass flow rate sensor being so disposed that the fluid inlet to the sensor is connected to the fluid inlet portion at the end of the plunger and the fluid outlet portion of the sensor is connected to a fluid outlet portion formed at the other end of the sensor or (e) the flow rate sensor comprises a pressure-based flow rate sensor so as to detect the a pressure generated by the fluid flowing in the space between the outer circumferential surface of the plunger and inner circumferential surface of the conduit or (f).

Response to Arguments

6. Applicant's arguments with respect to claims 1 - 14 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ramesh Krishnamurthy whose telephone number is (703) 305 - 5295. The examiner can normally be reached on Monday - Friday from 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David A. Scherbel, can be reached on (703) 308 - 1272. The fax phone number for the organization where this application or proceeding is assigned is (703) 872 – 9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308 - 0861.

Ramesh Krishnamurthy
Examiner
Art Unit 3753
November 16, 2003